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Heart Failure

EXERCISE TRAINING UP-REGULATES PHYSIOLOGICAL GROWTH SIGNALLING IN THE MYOCARDIUM OF PATIENTS WTH MECHANICAL CIRCULATORY SUPPORT: RELEVANCE TO FUNCTIONAL RECOVERY

Oral Contributions
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Background: To investigate whether exercise training in patients with end-stage heart failure (HF) supported by Ventricular Assist Device (VAD) results to benefits in functional capacity and favorable changes in growth signalling pathways implicated in cardiac remodeling.

Methods: Thirty-two patients with VAD bridged to heart transplantation (HTx) were included in the study. Patients were randomly assigned to a non-training control group (CG, n=16) or to a training group (GT, n=16), aerobic training for 45 min at Borg scale 12-14 for 3-4 times a week plus high- intensity inspiratory muscle training, initially at the hospital (12 weeks) and then at the home with confirmation of adherence until HTx. Echocardiography and cardiopulmonary exercise testing (peak VO2) were performed pre VAD and pre-HTx in as well as thyroid hormone level measurements.

Total (t) and phosphorylated (p) Akt , ERK1/2 and JNK as well as TRα1 protein, which is downregulated in HF, were measured in myocardial tissue by western blotting analysis, at the time of VAD placement and at HTx, in 7 pts in each group.

Results: Physical training resulted in a significant increase in both peak VO2 (ml/kg/min) and LVEF (%) in GT as compared to CG [17.0(sem, 0.8) vs 12.6 (0.7), $p<0.05$ and [29.5(1.5) vs 22.6(0.7), $p<0.05$] respectively. In pre-HTx samples, the ratio of p/t-AKT was 2 fold higher in GT than in group CG, $p<0.05$. The ratio of p/t-ERKs was 1.6 fold higher ($p<0.05$) and the ratio of p/t-JNK levels were 2.5 fold lower ($p<0.05$) in GT vs CG. A 2.0 fold increase in myocardial TRα1 expression and an increase in circulating T3 was found in GT vs CG, $p<0.05$.

Conclusions: Physical training in VAD recipients improves aerobic capacity and this response is associated with favorable changes in physiologic growth signaling pathways, and the TRα1/T3 concomittant increase.